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CENTRAL INTELLIGENCE AGENCY

REPORT NO.

OE NO

INFORMATION REPORT

COUNTRY

Port of Entry

DATE (USFR)

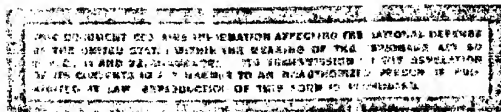
SUBJECT

Development of a Small Dimension Accelerograph by NO OF PAGES
Technical Bureau No. 2 of SAG KabelPLACE
ACQUIRED

NO. OF ENCLS.

DATE OF
INFO.

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SUPPLEMENT TO
REPORT NO.

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1. The following is a translation of the technical specifications for Development Project No. 54-9, which is to be carried out in 1954 by the Scientific-Technical Office for Device Construction (WTEG) (NTB-3) of SAG Kabel. The specifications were signed by Larionov. 1/

Technical conditions for the development of an accelerograph of small dimensions.

1. Purpose:

1. The purpose of the project is to develop a device which measures and automatically records accelerations to which a moving body is subjected. Furthermore, the device is to record those accelerations which occur when a moving body strikes an obstruction or when a body starts its motion (discharge, shot, throw). 2/

2. Technical conditions:

2. The device is to make it possible to record accelerations which occur through a change of the motion speed within a range of zero to 200 meters per second.
3. Synchronized recording of the accelerations is to be performed in relation to three axes perpendicular to each other. The recorded components should make it possible to determine the amount and direction of the acceleration.
4. In relation to three fixed axes perpendicular to each other, the device will record the acceleration values which occur when the moving body strikes an obstruction or when it starts moving within the range of zero to 100 times the earth acceleration.
5. Recording of the acceleration components occurring when the body strikes (beim Aufstoss) will be done in relation to three fixed axes, so that it will be possible to determine the amount

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and direction of the coefficient of acceleration. The device will be equipped in such a way that it will also be possible to determine the time period during which the strike or start acceleration is effective.

6. Use of several writing devices and of several elements with different sensitivity is permitted. Parts may be exchanged mutually according to what use of the device is considered:
 - a) either to record the acceleration of the moving body
 - b) or to record strike and start acceleration.
7. The writing devices are to permit uninterrupted recording of the acceleration and of the time component of acceleration during 90 seconds at least. The recording method and the construction of the writing devices is left to the discretion of the constructors.
8. The dimensions of the device as such are not to exceed 200 x 150 x 100 millimeters. These dimensions do not include space needed for fixing frames or damping devices (Daempfungsglieder). The weight of the device as such is not to exceed eight to ten kilograms. Accurate indications of dimensions and weight will be established in the course of the development.

III. Acceptance conditions:

9. The method for testing the device (Pruefprogramm) will be established by the commissioned enterprise (Auftragnehmer) and coordinated with the commissioner prior to placement of the order. The constructor will, in the course of the development, suggest test and standard installations for the testing of the functional qualities of the accelerograph. With the aid of these installations, the states and processes of motion (as set forth in points 1 and 2) are to be imitated on a test stand. Acceleration or deceleration values (as set forth in point 4) which correspond to the desired conditions are to be set on the measurement gauges of the accelerograph. Before these installations and test stands are built, drawings of them are to be submitted to the commissioner so that their suitability can be studied.

IV. Items to be delivered:

- | | |
|-----------------------------|-----------|
| 1. Model | 1 sample |
| 2. Technical report | 2 samples |
| 3. Description | 2 samples |
| 4. Operational instructions | 2 samples |
| 5. Test protocol | 2 samples |
| 6. Spare parts | 2 sets |
2. After the technical specifications for a development project are given to WTBG 3, it usually formulates questions of its own for the purpose

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of clarifying the specifications. The following are the WTBG 3 questions relating to the accelerograph project. WTBG 3 declared that answers to these questions and interpretations are absolutely necessary:

1. The basic request (point 2) is interpreted to mean:
 - a. the expressions "zero to 200 meter per second" or "zero to 720 kilometers per hour" mean the speed range in which the body can move;
 - b. the temporal change of this speed, that is, the acceleration, is to be measured as a multiple of the gravitational acceleration "g" (9.81 m/sec^2).

In order to exclude misunderstandings, it is requested that the minimum and maximum values of the acceleration occurring during the motion be made known.

2. What is to be the position of the device within the moving body?
3. Concerning the power drives of the writing devices mentioned in points 6 and 7 above, the following questions must be answered:
 - a. Is a power source for the electrical drives of the writing devices already available or can a power source be carried with the accelerograph?
 - b. What kind of current is available or desired?
 - c. Which maximum output can be drawn from the source?
4. What special conditions are to be observed when the writing devices are cut in and cut out? Or: Which special conditions are to be observed at the beginning and the end of the measurement process proper:
 - a. for recording when the body is moving (points 2, 3 and 6a)
 - b. for recording at strike and start (points 4 and 6b)?
5. What are to be the measurement accuracies and the measurement ranges of the sensitive recording elements with respect to the recording of the acceleration values in the direction of the individual axes? Separate answers are requested for the cases indicated under a and b in 4.
6. What are the smallest values of acceleration (in percent of the maximum value) to be recorded relative to the individual components (direction of motion or acceleration)? An answer to this question is important for the proper setting of the recording width of the diagrams (point 5).
7. The conditions set forth in point 6 are interpreted to mean: Not all measurement ranges of the various measurement elements of the accelerograph are to be for maximum values of acceleration up to 1,000 g (as requested in point 4). It is therefore, admissible to provide smaller measurement ranges of elements which can be exchanged with each other. If so, what are the minimum and maximum

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values of acceleration which the device must be able to record? Separate answers according to a and b in point 4. An answer to this question appears necessary for the protection of the measurement elements against damage which could result when they are used outside their measurement ranges.

8. What is to be the measurement accuracy for the determination of time when the recorded diagrams are evaluated:

- a. for recording motion
- b. for recording at strike and start?

The answer is necessary in view of point 4 for laying out the diagram length and the operative speed of the writing devices.

9. Is it requested that both acceleration directions relative to each axis be recorded during one and the same action? Or can the recording be done separately in succession; or can the recording be done separately for strike and start, for instance, through substitution of measurement elements prior to the beginning of the experiment?
10. What are the normal values of the surrounding air at the place where the measurement device will be installed? What values are to be taken into consideration for the measurement process (pressure, temperature and humidity of the ambient air)? What changes of these values are allowed to occur during the measuring, that is, are supposed to remain within the error limits (measurement accuracy, see point 4) of the device?
11. What mechanical vibrations of the foundation not supposed to disturb the measuring process are in existence at the place where the accelerometer is to be installed (frequency range, vibration acceleration)?
12. Will there be magneto-electric fields or other outside disturbances near the accelerometer against which the measurement device must be protected?

It is suggested that a representative of the commissioner come to the development enterprise prior to the ultimate placement of the order so that definite technical conditions can be established, and development difficulties and some points which are technically unclear can be coordinated.

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1/ Comment. The specifications were originally drawn up in Russian and then translated into German. The German translation is extremely poor and equivocal. Accuracy of the English translation can therefore not be guaranteed.

2/ Comment. German text reads: Abzug, Abschuss, Abwurf.

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